Hospitality Company Using Couchbase NoSql Database

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Abstract

NoSql database is designed to support an ever **increasing number of users and data** and at the same time it maintains the **performance** efficiently.

We worked with Couchbase distributed NoSql document oriented database that reads and write big data in **JSON** and **GeoJSON** objects. Couchbase Server delivers high throughput required for real time big data applications. Spatial views support the GeoJSON format and allow bounding-box queries on complex geometries that are represented as points, line-strings, or polygons.

In Hospitality Company, spatial and geospatial views allow you to extract specific fields and information from Json data and create an index.

Introduction

Couchbase Server is a both document-oriented and a key value Nosql system. It guarantees high performance with a built-in object-level cache, asynchronous replication and data persistence.

❖ Hospitality company is a service industry that includes lodging, event planning, theme parks, transportation and many other fields. Usage rate or the vacancy rate is an important variable for this industry which needs consistency and high performance.

❖ Couchbase provides the use of views in order to develop secondary indexes on the documents to make querying of the JSON data easy.

❖ The user entered personal data and the booking data has been stored in the unstructured JSON format inside the buckets in the couchbase server using the serialization.

❖ Couchbase provides the sql like interface known as N1ql.

❖ Various aggregate functions like to search for the hotel or restaurant with the minimum or the maximum charges can be done without any extra scan like in sql rather it returns the whole document or particular attributes could be returned from within the document.

❖ Using Geospatial views provided by the couchbase server, the queries to track the number of hotels in a particular area could be easily scanned by specifying the geographic coordinates.

Why Couchbase??

You can easily manage your Couchbase cluster--adding, deleting, and fetching documents from the Couchbase Management GUI, for which MongoDB has no counterpart. Couchbase Server supports agile development with a **flexible data model** and a **powerful query language**, **scalable deployment** with a single node type and topology-aware clients.

❖ Deploy as a distributed cache for low latency reads
❖ Deploy as a key/value store for high performance reads and writes
❖ Deploy as a document database for powerful querying and lightweight analytics

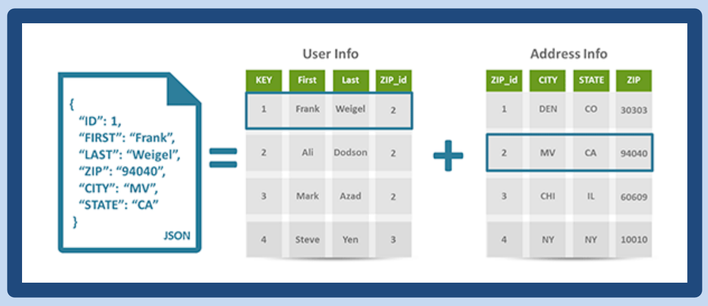
Viber replaced MongoDB with 50% fewer Couchbase servers. **AT&T, Comcast, eBay, GE, LinkedIn, Marriott, PayPal, Tesco, Verizon, VISA, Wells Fargo** and many other customers are using Couchbase.

Data Model

Couchbase Physical Data Model:

Relational Databases	Couchbase Server
Databases	Buckets
Tables	Documents with type designator attribute OR Buckets
Rows	Items (Key-Value or Key-Document)
Columns	Attributes
Index	Index

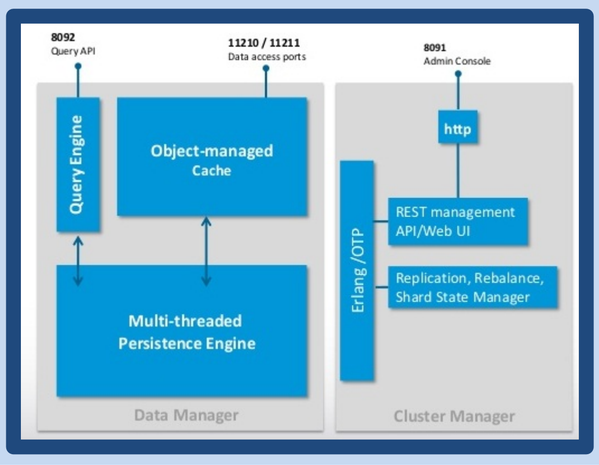
Couchbase stores the data in JSON format. The example below shows the data stored in relational database and the couchbase server.



Architecture

Couchbase Server Architecture:

Couchbase Server is built on a memory-first architecture and managing memory effectively is central to achieving high performance and scalability. **Cluster** Manager runs on all the nodes of the **cluster** and orchestrates **cluster** wide operations.



Implementation Features

We have tried to implement the features of Couchbase in our Hospitality Company using ASP.net Web Forms and N1QL for querying the JSON data. Some of the key features of our peoject are:

❖ Storing the data in JSON format using serialization and deserialization.

❖ Search various hotels and restaurants filtered by city/state/price from within the document attribute.

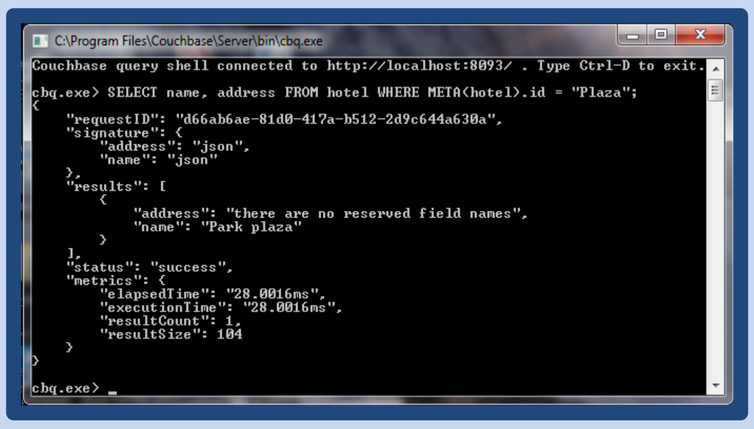
❖ Stores the user personal info, booking record in single document for high performance.

❖ Stores the user search history in order to provide recommendations

❖ Retrieve data faster using spatial and Geospatial views.

❖ Various queries using map and reduce functions.

❖ Sample query and its low elapsed time is shown below:



Conclusion

Database management system are useful when working with a huge quantity of data. System are distributed, non-relational database.

The main target is the consistency and the availability of the up to date data for the consumers which could be easily met using couchbase server

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